

# Physics Flash

Winter 2020

Approved for public release;  
distribution is unlimited.

## INSIDE

2

From Tanja's desk

3

Hsu, Prestridge,  
Van de Water named  
APS Fellows

4

Physics Division staff  
recognized for notable  
contributions to Lab's  
mission

5

Aberle contributes to  
innovative technology

6

Celebrating service  
HeadsUP!



Anna Llobet (right) takes a break during a tour of the Los Alamos Neutron Science Center with summer camp participants Davina Velasquez (left) and Savannah DeAgüero (center) of Pojoaque Valley High School.

## Anna Llobet

*Empowering young women  
to pursue STEM careers*

By Madeline Bolding, ALDPS Communications

“ You don’t do  
it for a pat on the back,  
you do it because it’s  
the right thing  
to do. ”

“I never understood gender stereotypes until I went to college,” said Anna Llobet. To this day she said she can recall sitting in a lecture hall at the start of her first upper-level undergraduate fluid dynamics class. When her professor arrived, Llobet said he saw 7 women sitting in the front row, among 80 or so men. He looked puzzled. He checked the time and checked the room number. Then he said, “Is everyone here for fluid dynamics? Even the girls?”

Today Llobet, an accomplished condensed matter physicist who has received awards for her contributions to the Lab’s national security science mission, aims to provide young women with an encouraging environment in which to develop the skills to succeed in science, technology, or engineering (STEM).

Over the past three summers, more than 60 young women from Northern New Mexico high schools have attended a

*continued on page 3*



“

*I am very impressed with the outstanding quality of P Division staff, the diversity of our work, our amazing and unique facilities, and our close connection to the Lab's diverse missions.*

”

*Tanja*

## From Tanja's desk . . .

Dear all,

It's just been over three months that I have had the privilege of joining P Division as your interim division leader. Hence, this letter may be my only opportunity to reach out to all of you, and I'd like to share some of my impressions.

Admittedly, I was a little biased when joining—biased in the sense of MPA (my home division) being the coolest division in ALDPS, if not the Lab. Oh boy, was I wrong! I am very impressed with the outstanding quality of P Division staff, the diversity of our work, our amazing and unique facilities, and our close connection to the Lab's diverse missions. I have never seen spaces as unusual as some of the ones we have—the 'neutrino tunnel,' the 'maze,' and some of our little buildings that house neutron experiments. They look like shacks from the outside, you open the door, and wow—there is an array of sophisticated instrumentation!

I have further had the privilege of meeting most of you in person—my apologies to the teams I have not been able to get together with yet. They are all on the schedule, but life occasionally happens, and we had to reschedule a few of them, in some cases repeatedly. Please don't take this as a lack of interest on my side—there simply is a lot going on and sometimes fires need to be extinguished right away and take priority. I have also had the opportunity to visit the NNSS, meet with our impressive team there, and had the opportunity to learn about the intricate intertwining of LANL, SNL, and MSTs in conducting experiments at Cygnus and downhole at U1A. I hope to catch our other deployed folks in the near future, and I am currently working with Ray Leeper to set up a NIF visit.

I also understand the challenges that we are facing. Most of the buildings on the LANSCE mesa and at TA-35 are over a half century old, and it's a constant battle for our FODs to keep them functional. Also, with P Division as one of the original three divisions at LANL, we have a lot of legacy equipment. Keith Rielage recently took me to 'shantytown' (in the basement of Building 1 at TA-53), and I was awed by our neatly organized collection of screws, nuts, bolts, O-rings, etc. As someone who built lab equipment in the distant past and now has shifted to home improvement projects, I felt like a kid in a toy store. On the downside, managing, organizing, and disposing of this legacy equipment is a major challenge in which we must continue to invest effort to ensure optimal use of our spaces. Everyone's help in this is appreciated.

I am truly happy and excited to be a part of P Division. It's been a rewarding and also challenging experience for me as there is so much to learn. I very much look forward to spending the next months with all of you!

*Interim Physics Division Leader Tanja Pietraß*



*Llobet cont.*

2-week day camp founded and organized by Llobet (Neutron Science and Technology, P-23).

The Los Alamos National Laboratory Summer Physics Camp for Young Women covers topics such as magnetism, electricity, rocketry, optics, radiation, space modeling, and biophysics. Taught by Los Alamos volunteer staff in partnership with local public school educators, the school includes hands-on demonstrations and tours of the Laboratory. Participants receive guidance on resume writing, interviewing, and maintaining a healthy work-life balance and are exposed to local college education programs and internships at LANL. This year's camp drew 36 applications, included 96 volunteers, and received support from local public schools and organizations.

To organize the event, Llobet leverages her physics education, Laboratory experience, and professional connections. Her efforts were recognized this year with a Los Alamos National Laboratory Distinguished Performance Award.

Llobet, who has a PhD in physics from Joseph Fourier University and the Universitat Autònoma de Barcelona, is project leader for Pu@pRad, the Lab's multimillion-dollar effort to re-establish the capability to perform small-scale explosively driven dynamic plutonium experiments at the Proton Radiography Facility at the Los Alamos Neutron Science Center (LANSCE). She has led the LANSCE Neutron School, a two-week course in neutron-based measurements taught by leaders in the field, organized several sections of a seminar series focused on physics and materials science, and leads the long-running Physics and Theory Colloquium, hosted by Physics and Theoretical divisions.

Her volunteer efforts range from collecting donations for women's shelters to donating time at public schools and science fairs. "You don't do it for a pat on the back," Llobet said of her volunteer work. "You do it because it's the right thing to do."

She said her tendency to help comes from her parents, who embodied generosity and expected it from their children. They regularly recited a Spanish phrase that roughly translates to "If you do as much as you can, you are not obliged to do more," Llobet said. Valuing education, her parents worked hard so that Llobet and her four siblings could attend Catholic schools and college. Llobet attended an all-girls school where she saw women she respected teaching every subject. Her college experience also taught her the value of supportive friendships. At one point, Llobet worked herself sick and quit school to recover. "My best friends helped me overcome the fear of going back to college and the fear of 'failing,' she said. "They helped me get back on my feet."

For the camp, Llobet builds on that experience, encouraging participants to support other women. In turn, her campers express their support. In endorsing Llobet's performance award, Niveditha Bala, from Mandela International Magnet School in Santa Fe, NM, wrote: "Dr. Llobet taught us the importance of building each other up and asking questions to make the world a better place." Santa Fe Capital High School student Ariana Garcia wrote to Llobet to thank her "for the amazing opportunities that were given to girls like me these past couple of days. This has truly inspired me even more to pursue a STEM career and maybe even get a full-time job at LANL." ■

## Hsu, Prestridge, Van de Water named APS Fellows

Scott Hsu (Physics, P-DO), Kathy Prestridge (Neutron Science and Technology, P-23), and Richard Van de Water (Subatomic Physics, P-25) were named 2019 American Physical Society (APS) Fellows, chosen for their "exceptional contributions to the physics enterprise." Fewer than one half of one percent of APS members are elected as Fellows each year.



Nominated by the Division of Plasma Physics, Hsu was cited for "seminal experiments elucidating the physics of merging plasmas and jets spanning hydrodynamic to magnetized, self-organized behavior, thus impacting basic plasma physics, plasma astrophysics, and innovative fusion concept development."

Nominated by the Division of Fluid Dynamics, Prestridge was cited for "thoughtfully designed experiments on shock-driven mixing and turbulence, and for developing advanced flow diagnostics that bring insights to the understanding of mixing in extreme flows."

Nominated by the Division of Particles and Fields, Van de Water was cited for "outstanding contributions to solar-neutrino and short-baseline accelerator-neutrino physics experiments that have shed new light on neutrino properties and have provided evidence for physics beyond the Standard Model."

Also named 2019 APS Fellows from Los Alamos were Hans Herrmann (Engineered Materials, MST-7) and Alan Hurd (National Security Education Center, NSEC). ■

## Physics Division staff recognized for notable contributions to Lab's mission

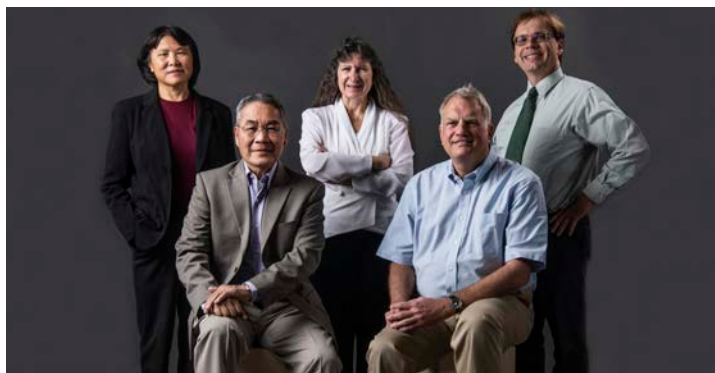
Nineteen members of Physics Division received 2018 Los Alamos National Laboratory Distinguished Performance Awards, acknowledging their outstanding contributions to the Laboratory's mission.



**Anna Llobet**

*Individual Distinguished Performance Award*

For her work on the Los Alamos Summer Physics Camp for Young Women, Anna Llobet, (Neutron Science and Technology, P-23) received an Individual Distinguished Performance Award. Please read more about Llobet's work with the camp (on the cover of *Physics Flash*).



### Ignition and Boost Metrics Team

*Small Team Distinguished Performance Award*

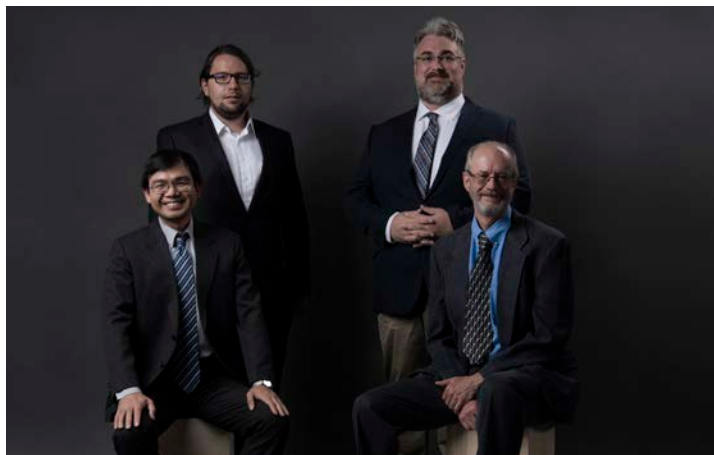
In 2018 the Ignition and Boost Metrics Team successfully completed its work to derive ignition metrics for inertial confinement fusion (ICF) capsules and primaries.

The work by Steven Batha (Plasma Physics, P-24), Thomas Kwan and Baolian Cheng (Plasma Theory and Applications, XCP-6), and Joyce Guzik and Robert Pelak (Nuclear Threat Assessment, XTD-NTA) provides a reference point from which to design primaries and ICF capsules; a check on simulations, which can be optimistic; and by using the same framework for primaries and ICF capsules, provides a stronger link between the ICF/high-energy-density physics program and boost, which is an important part of stockpile stewardship.

### MAJORANA DEMONSTRATOR Analysis Team

*Small Team Distinguished Performance Award*

The MAJORANA DEMONSTRATOR experiment uses special detectors to search for neutrinoless double beta decay, a rare process that could prove the neutrino is a Majorana parti-



cle—a particle that is its own antiparticle. If that turns out to be true, it could help explain why there is more matter than antimatter in the universe.

Steven Elliott, Ralph Massarczyk, Xiaoyu Zhu, and Brandon White (P-23), and Pinghan Chu (formerly Applied Modern Physics, P-21, now MPA-Quantum, MPA-Q) contributed greatly to the overall analysis of the experiment's first results. The quality and impact of their two 2018 *Physical Review Letters* publications symbolizes the experiment's overall significance and the Laboratory's valuable contributions to the MAJORANA DEMONSTRATOR's groundbreaking science. Based in part on the MAJORANA DEMONSTRATOR's successes, DOE and the National Science Foundation have chosen to develop a ton-scale neutrino detector, LEGEND, to further neutrino research.



### Marble Experimental Innovation Team

*Small Team Distinguished Performance Award*

Marble is an ambitious campaign to study the effects of mix on thermonuclear burn in ICF capsules. ICF experiments are used to validate the interplay of mix and burn in the Advanced Simulation and Computing codes used to support the Stockpile Stewardship Program.

The team, which includes Thomas Murphy (P-24), developed new methods for creating first-of-their-kind foams with macro-pores of known sizes and densities and then

*continued on next page*



### Physics Division staff cont.

used those foam capsules as the basis for an experimental platform capable of isolating the interplay of mix and burn from the other physical processes at play in the experiments. The experiments produced the first quantitative observation of mix-and-burn interplay in ICF capsules. The team includes Christopher Hamilton (Engineered Materials MST-7); Brian Haines (Eulerian Codes, XCP-2); Richard Olson (XCP-6); Melissa Douglas (X Theoretical Design, XTD-DO); and Brian Albright (XTD Primary Physics, XTD-PRI).



### ERIS: Safe Stoppable and Restartable Solid Rocket Team

*Large team Distinguished Performance Award*

This ERIS team developed a high-energy propulsion system for small-payload satellites. ERIS, the electrolysis rocket ignition system, provides a stop-and-restart capability, along with safe, efficient solid-rocket propulsion based on a revolutionary technology. ERIS can have a significant impact not only on the use of small satellites but also on missile intercept technologies. It has the potential to fill a critical space national security need that no other options, government or commercial, can fill.

The team includes Nicholas Dallmann (formerly Applied Modern Physics, P-21, now MPA-Quantum, MPA-Q); Cynthia Hines (now LANSCE Weapons Physics, P-27); Cassidy Shedd (formerly P-21, now MPA-Q); Miranda Webber (DDSTE Finance, FA-BUD, working with P-21); Mahlon Wilson and Kavitha Chintam (Materials Synthesis and Integrated Devices, MPA-11); Bo Folks (Finishing Manufacturing Science, Sigma-2); Bryce Tappan, Joseph Lichthardt, and Ian Shelburne (HE Science and Technology, M-7); David Hemsing, Jacob Valdez, and Malakai Coblenz (Space Instrument Realization, ISR-5); Eva Baca and Alan Novak (Explosive Applications and Special Projects, M-6); and Mitchell Hoffmann (XTD Integrated Design and Assessment, XTD-IDA).



### 3D Neutron Imaging Effort for the National Ignition Facility

*Large Team Distinguished Performance Award*

This team designed, built, and deployed a new neutron-imaging system for the National Ignition Facility. Neutron imaging is a powerful diagnostic tool developed over the years by the team members to diagnose ICF implosions. The new system's addition allows the first-ever three-dimensional tomography of the neutron-producing region of the burning fuel in ICF capsules.

The team includes Petr Volegov, Carl Wilde, Christopher Danly, Verena Geppert-Kleinrath, and Jacquelynne Vaughan (P-23); Steven Batha, Valerie Fatherley, and Michael Springstead (P-24); Lynne Goodwin, Derek Schmidt, and John Martinez (MST-7); Harold Jorgenson (Process Automation and Control, E-3); Douglas Wilson (XCP-6); and Frank Merrill (XTD-PRI). ■

### Aberle contributes to innovative technology

*Retro RX receives 2019 R&D Gold Medal special recognition*

Retro RX—LANL developed technology for responding to outbreaks and re-emergence events—received a Gold Medal for Corporate Social responsibility from the judges of the R&D 100 Awards. The special recognition honors organizational efforts to be a greater corporate member of society, from a local to global level.



*continued on next page*

## Aberle cont.

The development team included Derek Aberle (Neutron Science and Technology, P-23).

Rapid, easy tools for responding to outbreaks and re-emergence events use web-based information to assess infectious disease outbreaks and then provide visual analytics and actionable information to mitigate them and protect the population. The analytic tools require minimal effort and expertise and can be used for research, decision-making, analysis, forecasting, and training and education.

Alina Deshpande (Biosecurity and Public Health, B-10) led the team, which included researchers from Information Systems and Modeling (A-1), Physics and Chemistry of Materials (T-1), HPC Environments (HPC-ENV), Actinide Analytical Chemistry (C-AAC), National Security and Defense Program Office (GS-NSD), W76 Systems Engineering (W-2), and collaborators from the University of New Mexico, University of Virginia, University of California, Santa Barbara, and Specifica Inc.

Their work was funded by the Defense Threat Reduction Agency, Department of Homeland Security, and Laboratory-Directed Research and Development Reserve. This research supports the Laboratory's Global Security mission and the Information Science and Technology pillar. ■

*Technical contact: Derek Aberle*

## Celebrating service

Congratulations to the following Physics Division employees who recently celebrated a service anniversary:

Peter Pazuchanics, P-23 .....	35 years
Vincent Yuan, P-23 .....	35 years
Thomas Archuleta, P-24 .....	30 years
Nikolaos Fotiadis, P-27 .....	20 years
Sasikumar Palaniyappan, P-24 .....	10 years
Ralph Massarczyk, P-23 .....	5 years

# HeadsUP!

## Make sure your vehicle is ready for winter

- If you have all-season tires on your car or light truck, ensure that they are not more than 40%–50% worn to provide adequate traction in serious snow. Even all-wheel drive vehicles are only as good as the tread on their tires.
- Windshield wipers and all-season washing fluid must be ready to quickly clear filth, slush, and water from your field of view.
- Are all of your lights (headlights, running lights, tail lights, brake lights, and turn signals) operating?
- Have you checked your heater and defroster?
- Do you have a small shovel and some sand and emergency supplies (flares, blanket, flashlight, emergency chains, cell phone) handy? Do you have a windshield scraper and snow remover, and do you plan to clear all of your windows for safe visibility?



Published by the Physical Sciences Directorate.

To submit news items or for more information, contact Karen Kippen, ALDPS Communications, at 505-606-1822 or [aldps-comm@lanl.gov](mailto:aldps-comm@lanl.gov).

For past issues, see [www.lanl.gov/org/ddste/aldps/physics/physics-flash-archive.php](http://www.lanl.gov/org/ddste/aldps/physics/physics-flash-archive.php).



Los Alamos National Laboratory, an affirmative action/equal opportunity employer, is operated by Triad National Security, LLC, for the National Nuclear Security Administration for the U.S. Department of Energy under contract 89233218CNA000001.

